management" system
parcels of oil a year.

Work with local refinery personnel to
monitor and assess all aspects of energy
use, treating the entire refinery as
an integrated energy system. Synergis-
tic conservation opportunities are
sought, not only within the refinery, but
to with neighboring industries and
utilities. Projects which could foster
cooperative energy efficiency, including
integration and heat/power cogeneration
possibilities, are considered.

Highly specialized computer pro-
grams help the team synthesize poten-
tial energy-saving alternatives, and
evaluate them according to thermo-
dynamic, operational and economic
criteria. The results are used by refinery
managements to plan and implement
with short-term and long-range energy-
saving programs.

Today, Exxon’s refineries around the
world are, on the average, 23% more
energy-efficient than they were in 1973.

Site Energy Surveys completed to
date have identified substantial addi-
tional energy-savings opportunities.

Hot Belts and Other Technologies
ER&E is applying a variety of other
technologies in the search for energy
savings as well. One concept is the heat
transport loop, or “hot belt,” that ex-
changes energy between multiple

sources and sinks within the refinery,
and even outside of it. High activity
catalysts which permit lower reaction
temperatures are being researched, as
are low-energy separation processes
such as membranes, and sophisticated
computer control systems for on-line
optimization of energy efficiency.

Exxon Research and
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Energy conservation is but one of
the broad range of activities at Exxon
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apply new technology in the manu-
facture of fuels and other products. For
more information on ENCON and ER&E,
write Ed David, President, Exxon
Research & Engineering Company,
Room 603, P.O. Box 101, Florham Park,
New Jersey 07932.
For his pioneering contributions to geostationary communications satellites, Dr. Harold Rosen of Hughes has been given the prestigious Alexander Graham Bell Medal by the Institute of Electrical and Electronic Engineers. Rosen is credited with conceiving the first practical geostationary communications satellite, which orbits 22,300 miles high and appears to hover in the sky. A single satellite covers over a third of the globe. Early satellites orbited at low altitudes and would have required a large orbiting fleet and complicated tracking procedures if continuous communications were to be provided.

A complete 3-D microelectronic 32x32 array processor is significantly closer to being demonstrated now that Hughes scientists have fully interconnected a stack of two wafers. Each of the wafers has a 32x32 array of aluminum feedthroughs migrated through the silicon wafer, forming low resistance paths across the wafer. Micro-spring bridges made for each unit cell of the array connect one wafer to the other. Improvements in fabrication and assembly techniques led to a performance yield on bridge/feedthrough interconnections of better than 99%.

Scientists have tracked the ash plume from the Mexican volcano El Cinchon with the aid of a weather satellite. Daylight and infrared pictures from GOES-5 (Geostationary Operational Environmental Satellite) clearly showed the April 4 eruptions even from 22,300 miles in space. Subsequent images revealed the plume rising high into the stratosphere and across the Yucatan peninsula. The dust now rings the planet in a wide band. Because El Cinchon blew far more dust into the stratosphere than did Mount St. Helens in 1980, scientists are speculating on the volcano’s long-term effects on world climate. GOES-5 was built by Hughes and is operated by the National Oceanic and Atmospheric Administration.

The new Intelsat VI communications satellite is configured to minimize launch costs and to be deployed easily from NASA’s Space Shuttle. The drum-shaped spacecraft, when folded, fits snugly in less than half of the Space Shuttle’s cargo bay. Its weight and length are proportioned to take advantage of launch pricing policies. Intelsat VI will be ejected from its cradle much as a flying disc is thrown. The method imparts a slow spin to stabilize the spacecraft. A perigee motor will kick Intelsat VI into synchronous orbit, after which spin thrusters will fire to stabilize it. Finally, the antenna system will unfold and an outer panel of solar cells will telescope down to provide extra power. Hughes heads an international team building the Intelsat VI series for the International Telecommunications Satellite Organization.

Career growth opportunities exist at all levels at Hughes Support Systems for a variety of engineers qualified by degree or extensive work experience. They include systems engineers and software and hardware design engineers for major simulation and test equipment programs. Also, field engineering posts throughout the U.S. and the world offer travel, autonomy, and responsibility for the life cycle of Hughes electronics systems. Phone collect (213) 513-5235. Or send your resume to Professional Employment, Dept. SE, Hughes Aircraft Company, P.O. Box 9399, Long Beach, CA 90810-0463. Equal opportunity employer.
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